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(71) Applicant: **WESTLAND AIRCRAFT LIMITED, Yeovil Somerset (GB)**

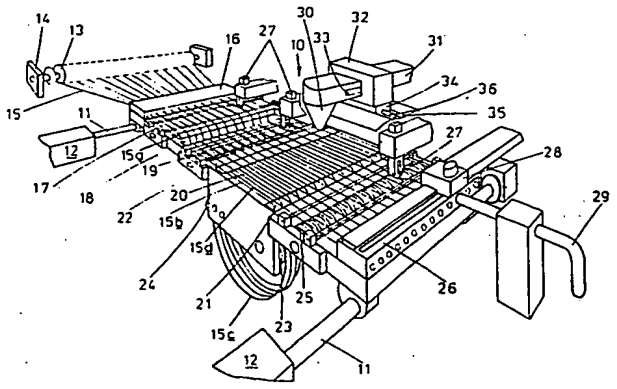
(72) Inventor: **Mills, John Barry, 19 Primrose Lane, Yeovil Somerset (GB)**
Inventor: **Roberts, Christopher Henry, 113 Park View, Crewkerne Somerset (GB)**

(74) Representative: **Jack, Bruce James et al, FORRESTER & BOEHMERT Widenmayerstrasse 4/I, D-8000 Munchen 22 (DE)**

(54) Cable marking method and apparatus.

(57) A method for marking an identification at pre-selected intervals along a length of cable by laser marking means comprises the steps of sequentially moving longitudinally spaced-apart portions of the cable along a marking platen and positioning and operating the laser to mark the stationary cable portion while the other cable portion is being moved.

In a preferred embodiment of cable marking apparatus, each of a plurality of cables is routed across a marking platen, down through a downstream aperture, up through an upstream aperture to form a slack loop beneath the platen and back across the platen so that the longitudinally spaced-apart portions are located in parallel juxtaposed relationship across the platen.



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marking an identification at selected intervals along a cable length comprising a carriage block assembly including a marking platen and laser operated marking means positioned above the platen, wherein input and output portions of a cable length are routed longitudinally across the platen in substantially parallel juxtaposed relationship, and including drive means to sequentially move the input and output portions across the platen and positioning means to alternately position the laser marking means laterally in operative relationship with a stationary one of the cable portions.

Preferably, apertures are provided through the carriage block assembly upstream and downstream of the marking platen, the input portion of the cable being routed longitudinally across the platen and down through the downstream aperture to form an unrestrained loop portion beneath the platen, the cable being routed from the loop portion up through the upstream aperture to the output portion.

The drive means may comprise driven rollers carried by the carriage block assembly and located upstream and downstream respectively of the marking platen. Preferably, the driven rollers are spaced-apart vertically below the cable length and are operatively associated with idling rollers supported above the cable length and selectively moveable downwardly into contact with the respective driven roller to press the cable on to the surface of said driven roller.

Conveniently, a plurality of cable lengths are located along the carriage block assembly in spaced-apart substantially parallel relationship, the carriage block assembly being moveable laterally so as to locate a selected one of the cables beneath the idling rollers and the laser marking means.

The cables may be individually located through apertures in guide block assemblies located upstream and downstream of the driven rollers, the cables being drawn from cable reels located on a cable support means at one end of the apparatus adjacent the upstream guide block assembly. Conveniently, the downstream guide block assembly incorporates cable measuring means to measure the length of cable passing through the guide block, and may be operatively associated with a guillotine to cut the cable to a desired length.

Cable guide means may be provided at the downstream end of the

input and output portions of the cable.

The invention will now be described by way of example only and with reference to the accompanying drawings, in which,

Figure 1 is a fragmentary perspective illustration of a cable marking apparatus constructed in accordance with this invention, and

Figures 2A to 2F inclusive are schematic drawings illustrating operational features of the apparatus of Figure 1.

Referring now to Figure 1, apparatus for marking an electric cable with a desired identification at selected intervals throughout its length comprises a carriage block assembly generally indicated at 10.

The carriage block assembly 10 is mounted on two ballscrews 11, one at each end thereof, the ballscrews being operated by electric motors 12 to selectively position the assembly 10 laterally. A plurality of cable reels 13 are located on a support stand 14 spaced-apart longitudinally from one end of the assembly 10, and cable 15 from each reel 13 is located through respective apertures in an upstream guide block assembly 16 located adjacent the one end of the assembly 10.

Each of the cables 15 follows an identical longitudinal path along the carriage block assembly 10, and this will now be described in relation to the particular cable identified by reference numeral 15 in Figure 1.

From guide block 16, the cable 15 passes over a driven roller 17 powered by an electric motor (not shown). The cable then hangs loosely at 15a across an aperture 18 in the carriage 10, and extends across a second driven roller 19. An input portion 15b of the cable is located longitudinally across a marking platen 20 and is routed downwardly through a lateral aperture 21 downstream of the platen 20 to form a slack loop portion 15c below the platen 20. The cable re-emerges through a second aperture 22 upstream of the platen 20 and an output portion 15d of the cable is again located along the marking platen 20 and parallel to input portion 15b.

Thus, each one of the plurality of cables 15 has longitudinally spaced-apart input and output portions located across the surface of the marking platen 20 in parallel juxtaposed relationship, with an unrestrained loop portion 15c provided between the input and output

means 30 is carried at an end of an arm 31 slidably mounted laterally of the carriage block assembly 10 in a housing 32. A toothed rack 33 is fixed to the arm 31 and is engaged by an electrically driven pinion (not shown) located in the housing 32. The housing 32 is supported by guide means 34 located in a trackway 35 parallel to the carriage block assembly 10 and is operatively associated with a threaded screw 36 rotatable by an electric motor (not shown). By these means, the laser marking head 30 is moveable laterally and longitudinally relative the carriage block assembly 10.

The motors 12, driven rollers 17, 19, 23, 24 and 25, the idling rollers 27, the guillotine 28 and the positioning and functioning of the laser marking means 30, are preferably controlled by a microprocessor (not shown) programmed to operate the various items in a particular sequence as hereinafter described.

In operation of the apparatus of this invention, the motors 12 are energised so as to move the assembly 10 laterally to position a desired one of the plurality of cables 15 beneath the aligned idling rollers 27. It will be apparent that this positioning of the assembly 10 also serves to bring the laser marking means 30, the guillotine 28 and the cable guide tube 29 into functional alignment with the same one of the plurality of cables 15. The idling rollers 27 are moved vertically downwardly so as to press the desired cable 15 into its circumferential groove in the driven rollers 17, 19 and 25. The further idling rollers (not shown) are simultaneously moved into a similar operational relationship with driven rollers 23 and 24.

Energisation of any of the driven rollers 17, 19, 23, 24 and 25 will result in longitudinal movement of the particular cable 15, and the sequence of such energisation as well as the sequence of position adjustment and energisation of the laser marking means will now be described with reference to Figures 2A to 2F inclusive of the accompanying drawings.

In the drawings, identification markings being printed on the input portion 15b are shown in broken line, and those printed on the output portion 15d in full line. Also it will be understood that although shown vertically spaced-apart for illustrative purposes, the input and output portions 15b and 15d respectively are in fact

driven rollers 24 and 25 being alternately activated to feed the cable forward by a distance equal to two pitches, results in a fully marked cable 15 (i.e. marked at one pitch intervals) moving towards the block 26, and is continued until the pre-programmed length of the particular cable has been marked.

The length of cable moving through guide block 26 is sensed by the measuring means (not shown) which functions to initiate operation of the guillotine 28 to cut the cable to the desired length.

It will be clear that the next time that the particular cable 15 is selected for marking as part of another set of cables, provided the required identification is the same, the single pitch sequence of driven rollers 24 and 25 and output portions 15d need not be repeated since the length of cable between platen 20 and the downstream guide block 26 will already have been marked.

In order to mark the next one of a desired set of cables, the idling rollers 27 are released and the assembly 10 is moved laterally until the next selected one of the cables 15 is located beneath the idling rollers 27. The above sequence of operations is then repeated to mark the next desired cable.

From the guide block 26, the cable being marked runs through the cable guide tube 29 and exits into a cable receptacle (not shown) but which preferably is constructed to house a complete kit of cables segregated in a desired sequence to facilitate subsequent operations.

The slack in each of the cables 15 provided by the cable hanging across the aperture 18 serves to reduce the inertia effects in the cable due to the movement imparted by driven roller 19 and, if desired, the cable support 14 can be provided with tensioning devices operative on the individual cable reels 13 to further reduce inertia and to prevent overrun of the cable reels 13 as the cable 15 is being drawn from the reel.

Thus, in the apparatus of the present invention, the cable being processed is continuously moved along the carriage block assembly although the particular portion of the cable length actually being marked is always stationary. Since all of the different cable types of a particular assembly are permanently threaded through the apparatus, the access time required to change from processing one

CLAIMS

1. A method of marking an identification at pre-selected intervals along a cable length by laser marking means comprising the steps of arranging the cable with two longitudinally spaced-apart portions located across a marking platen, sequentially moving the respective portions along the platen and positioning and operating the laser marking means to mark a desired identification on the stationary one of said cable portions while said other cable portion is being moved across the platen.

2. The method of Claim 1 further comprising the steps of locating said cable across an upper surface of the platen, around beneath a lower surface of the platen in an unrestrained loop and back across the upper surface of the platen so that said spaced-apart cable portions are arranged in parallel juxtaposed relationship on the upper surface of the platen.

3. Apparatus for marking an identification at pre-selected intervals along a cable length by laser marking means characterised by drive means adapted during use to sequentially move two longitudinally spaced-apart portions of the cable length along a marking platen, and positioning means adapted to establish an operative relationship between the laser marking means and a stationary one of the cable portions.

4. Apparatus for marking an identification at pre-selected intervals along a cable length comprising a carriage block assembly including a marking platen and laser operated marking means positioned above the platen, characterised in that longitudinally spaced-apart input and output portions of a cable length are routed across the platen in substantially parallel juxtaposed relationship, said apparatus including drive means to sequentially move the input and output portions across the platen and positioning means to alternately position the laser marking means in operative relationship with a stationary one of the cable portions.

support means located at an end of the apparatus adjacent the upstream guide block assembly.

12. Apparatus as claimed in Claim 10 or Claim 11, characterised in that said downstream guide block assembly incorporates cable measuring means.

13. Apparatus as claimed in any one of Claims 10 to 12, characterised in that a guillotine is operatively associated with said downstream guide block assembly.

14. Apparatus as claimed in any one of Claims 10 to 13, characterised in that cable guide means is provided downstream of said downstream guide block assembly, said guide means being adapted to guide the cable into a cable receptacle.

15. Apparatus as claimed in any preceding claim and controlled by a pre-programmed micro-processor.

16. Apparatus for marking an identification at selected intervals along a cable length comprising a carriage block assembly including a marking platen and a laser operated marking means positioned above the platen, characterised in that apertures are provided upstream and downstream of the platen, an input portion of the cable being located along the platen through the downstream aperture and up through the upstream aperture to form a slack loop below the platen, an output portion of the cable being located across the platen in parallel juxtaposed relationship with the input portion, drive means arranged to sequentially move said input and output cable portions and control means arranged to operate said drive means and said laser means and to position said laser means so as to mark a stationary one of said input and output portions.

17. Apparatus for marking an identification at selected intervals along a length of cable and comprising a carriage block assembly including a marking platen, apertures at upstream and downstream ends of the platen, an input portion of the cable being routed across the

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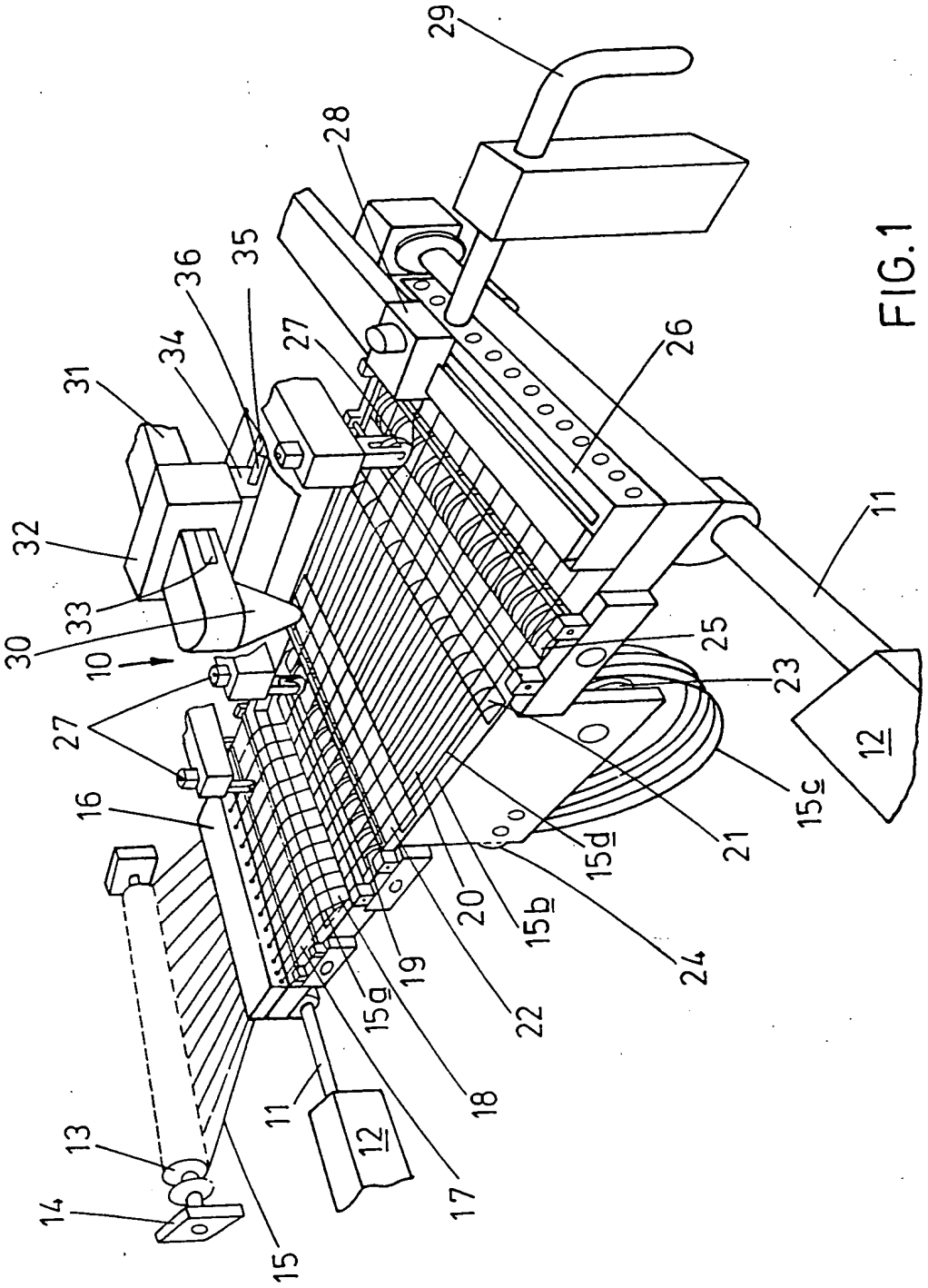

FIG.1

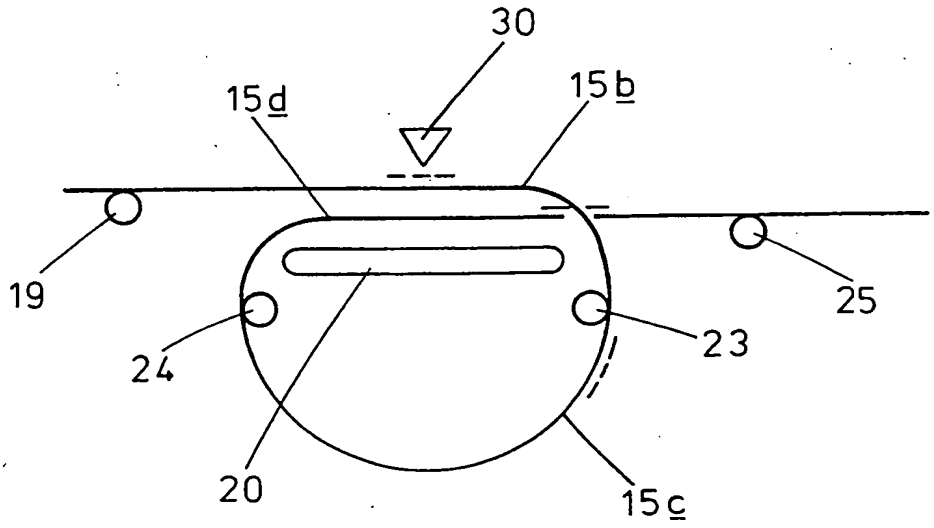

FIG. 2C

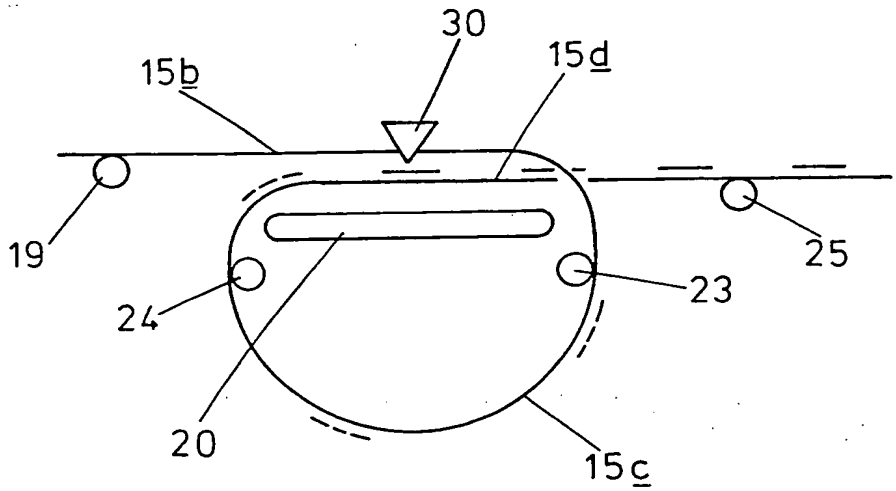

FIG. 2D

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EUROPEAN SEARCH REPORT

0040929
Application number

EP 81302136.7

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim
A	DE - A1 - 2 323 799 (GUTEHOFFNUNGS-HÜTTE) + Page 5, line 1 - page 6, line 13 + --	1
A	US - A - 4 107 528 (SILVERMAN) + Fig. 2-5 + ----	1

CLASSIFICATION OF THE APPLICATION (Int. Cl.³)

H 01 B 7/36

TECHNICAL FIELDS SEARCHED (Int. Cl.³)

H 01 B 7/00
H 01 B 13/00
B 41 F 17/00
B 41 J 3/00
B 29 H 21/00
G 01 D 15/00

CATEGORY OF CITED DOCUMENTS

X: particularly relevant
A: technological background
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X The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
VIENNA	30-07-1981	KUTZELNIGG

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